ATRIPLEX MINUTICARPA (CHENOPODIACEAE), A NEW SPECIES FROM EASTERN UTAH

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ABSTRACT

Atriplex minuticarpa, a new annual species from Eastern Utah is described and illustrated. The new species appears to be restricted to the Tununk-Shale Member of Mancos Shale in Emery, Grand and Wayne Counties of Utah. It is morphologically closest to *A. powellii* but differs in its divaricate-branching habit, densely imbricate, sessile leaves, small fruiting bracts and utricles, and monoecious inflorescenses with staminate and pistillate flowers in mixed glomerules.

This distinctive new annual species of *Atriplex* was discovered by the first author, 3 May 1985, on a south-facing gentle slope at the base of the Tununk Shale Member of Mancos Shale, 6 mi S of Floy Station, T23S R18E S4, 4500 ft elevation, Grand Co., UT. Review of annual *Atriplex* species in several herbaria (ASC, BRY, CAS, COLO, CS, DAV, GH, IDS, MO, MONT, NY, OC, RENO, RM, RSA, TEX, UC, UNM, US, UT, and UTC) showed only two other previous collections of the new species: *J. G. Harris 855,* 4 Jun 1980 (UTC) and *S. L. Welsh 23241,* 3 Nov 1985 (BRY). Both of these collections were labelled *A. powellii.*

Atriplex minuticarpa Stutz & Chu, sp. nov. (Fig. 1).—TYPE: USA, Utah, Grand Co., 3 mi E of Green River, T21S R17E S19, gentle south-facing slope, Tununk Member of Mancos Shale, 4000 ft (1219 m), 10 Nov 1988, *H. C. Stutz 9547* (holotype, BRY).

Herbae annuae, 10–45 cm altae, caulis erectus, ramosus a basi ad apicem, ramis inferiis late divaricatis ad angulum 50°–90°, ramis superiis ad angulum 20°–45° patentibus. Folia alterna, dense disposita, deltato-ovata usque orbiculari-ovata, imbricata, 5–15 mm longa, 5–15 mm lata, aliquantum succulenta et caesio-virides, apice acuta vel breviter acuminata, basi late cuneata usque leviter cordata, integra, sessilia, utrinque dense furfuracee farinosa, venae inconspicuae. Flores monoecii, staminati et pistillati flores in mixte glo-

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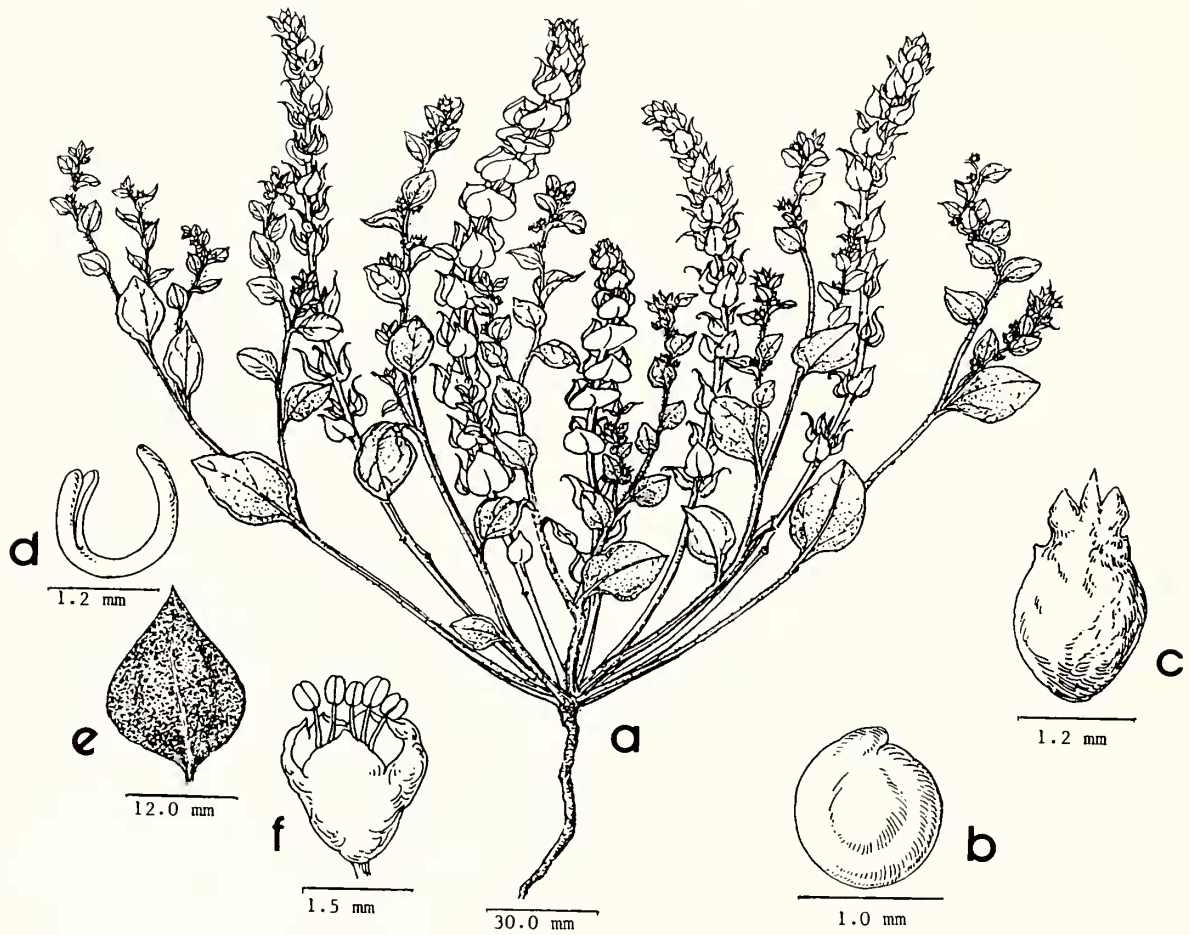

FIG. 1. *Atriplex minuticarpa*. a. Habit. b. Seed. c. Fruiting bract. d. Embryo. e. Leaf. f. Male flower. (Drawings by Xia Quan.)

merulos, axillares. Staminatorum florum perianthia obovata, circa 1.5 mm longa, 5-lobata, segmentis saepe deltatis, membranaceis, stamina 5, antheris circa 0.7 mm longis, plerumque purpurale-rubris, filamentis antheris leviter longioribus. Pistillatorum florum bracteolae connatae fere ad summia, stigmata 2, 1–1.5 mm longa, styli inconspicuo, fructiferi bracteae ovato-oblongae, 1.5–2 mm longa, apeice 3 dentiformibus emergentiis, medianus eo leviter magnior, utrinque plerumque absque appendicibus. Utriculus ovatus usque orbicularis, semen 1–1.2 mm diam., testa membranaceae, flavi-bruneola, radicula supera (Fig. 1).

Annual herbs, 10–45 cm tall. Stems usually erect, ramified from base to top, often purple-reddish; lower branches diverge at wide angles (50°–90°), upper branches diverge at acute angles (20°–45°). Leaves alternate to densely imbricate, deltoid-ovate to orbicular-ovate, 5–15 mm long, 5–15 mm wide, somewhat succulent and blue-greenish, entire, acute to short acuminate at apex, broad-cuneate to slightly cordate at base, sessile, densely scurfy on both surfaces, Kranz-type venation, veins inconspicuous. Flowers monoecious, staminate and pistillate flowers in mixed glomerules in axils of most leaves. Perianth of staminate flowers 5-lobed, segments nearly deltoid, obovate, ca. 1.5 mm long, membranaceous; stamens 5, anthers

ca. 0.7 mm long, usually purple-reddish, filaments slightly longer than anthers. Bracteoles of pistillate flowers fused to near summit; stigmas 2, 1–1.5 mm long; style inconspicuous; fruiting bracts ovate-oblong, 1.5–2 mm long, 1–1.5 mm wide with 3 dentiform emergences at apex, the middle one slightly larger, usually without appendages on surfaces. Utricle ovate to orbicular; seed 1–1.2 mm in diam.; testa membranaceous, yellow-brown; radicle superior. Chromosome number: $2n=18$. Flowering period: May to July.

ADDITIONAL COLLECTIONS: USA, Utah Emery Co.: 11 mi SW of Green River, Hwy I70, mi 149, T21S R14E S35, 5 Jun 1992, *H. C. Stutz 95635* (BRY); ca. 11 mi W of Green River, T22S R14E S22, 4000 ft, 3 Nov 1985, *S. L. Welsh 23242* (BRY); San Rafael Swell, Little Wild Horse Mesa, T26S R10E S19, 4650 ft, 4 Jun 1980, *J. G. Harris 855* (UTC); Green River, southwest edge of town, T21S R16E S17, 15 Sep 1992, *H. C. Stutz 95680* (BRY); 3 mi SW of Green River, occasional patches of 50–100 plants in draws between S facing slopes, T21S R15E S24, 4100 ft, 8 May 1991, *H. C. Stutz 95491* (BRY); 5 mi SW of Green River, T21S R15E S26, 16 May 1991, *H. C. Stutz 95502* (BRY); 10 mi SW of Green River, T22S R15E S17, 9 May 1991, *H. C. Stutz 95492* (BRY); 10 mi W of Green River, Hwy I70, mi 149, T21S R14E S35, 5 Jun 1992, *H. C. Stutz 95635* (BRY); ca. 11 mi W of Green River, T22S R14E S22, 4000 ft, 3 Nov 1985, *S. L. Welsh 23242* (BRY); San Rafael Swell, Little Wild Horse Mesa, T26S R10E S19, 4650 ft, 4 Jun 1980, *J.* T17S R13E S24, 21 Jul 1992, *H. C. Stutz and S. C. Sanderson 95657* (BRY); 6 mi SW of Goblin Valley State Park, Little Wild Horse Cnyn., T26S R10E S21, 23 Sep 1992, *H. C. Stutz and S. C. Sanderson 95712* (BRY); ¼ mi N of Muddy Creek on Tununk Shale, T26S R9E S23, 23 Sep 1992, *H. C. Stutz and S. C. Sanderson 95714* (BRY); SE side of Muddy Creek, Tununk Shale, T26S R9E S27, 23 Sep 1992, *H. C. Stutz and S. C. Sanderson 95715* (BRY); Grand Co.: 3 mi E of Green River, T21S R17E S19, 16 May 1989, *H. C. Stutz 95169* (BRY); 4 mi SE of Green River, T21S R17E S30, 3 May 1990, *H. C. Stutz 95485* (BRY); 5 mi SE of Green River, T21S R17E S29, 16 Apr 1992, *H. C. Stutz and M. R. Stutz 95605* (BRY); 7 mi SE of Green River, T21S R17E S33, 5 Sep 1992, *H. C. Stutz 95681* (BRY); 6 mi S of Floy Station, T22S R18E S33, 3 May 1985, *H. C. Stutz 9418* (BRY); 6 mi S of Floy Station, T23S R18E S4, 1 Sep 1988, *H. C. Stutz and G. Chu 94796* (BRY); 6 mi S of Floy Station, T23S R18E S4, 13 Jun 1989, *H. C. Stutz and M. R. Stutz 95195* (BRY); 1 mi N of Moab Airport, Tununk Shale, T23S R19E S11, 14 Jun 1992, *H. C. Stutz 95637* (BRY); 5 mi SE of Thompson, T22S R20E S2, 20 Jul 1992, *H. C. Stutz and S. C. Sanderson 95652* (BRY); Wayne Co.: 20 mi NW of Hanksville, ½ mi S of Wayne–Emery Co. line, T27S R9E S10, 23 Sep 1992, *H. C. Stutz and S. C. Sanderson 95717* (BRY); Neilson Wash, 5 mi SE of Factory Butte,

FIG. 2. Tununk Shale 4 mi E of Green River, Grand Co., UT, the formation on which almost all populations of *Atriplex minuticarpa* have been found. a. Tununk Shale Member of Mancos Shale. b. Ferron Sandstone member of Mancos Shale that caps the Tununk Shale.

T22S R9E S12, 23 Sep 1992, *H. C. Stutz and S. C. Sanderson 95718* (BRY); 2 mi E of Caineville, Hwy 24, Mile 106, T28S R9E S14, 23 Sep 1992, *H. C. Stutz and S. C. Sanderson 95719* (BRY); 6 mi SW of Caineville, Hwy 24, T29S R8E S2, 23 Sep 1992, *H. C. Stutz and S. C. Sanderson 95720* (BRY); 10 mi W of Hanksville, S side of Fremont River, Tununk Shale, T28S R10E S20, 23 Sep 1992, *H. C. Stutz and S. C. Sanderson 95722* (BRY).

DISTRIBUTION AND HABITAT

Atriplex minuticarpa is primarily restricted to the Tununk Member of Mancos Shale in eastern Utah (Fig. 2). It usually grows in small, dense populations, each covering a few hundred square meters, containing 30 to 50 plants per square meter. These small populations are often found contiguous to clay slopes that are devoid of vegetation.

Associated species. Atriplex minuticarpa usually grows as a monoculture but sometimes there are present a few plants of *Atriplex corrugata, A. powellii, Eriogonum inflatum, Euphorbia fendleri, Halogeton glomeratus,* or *Salsola australis.*

Phenology. Flowering and fruiting: Mostly April and May but summer storms often promote prolonged growth and new seedlings that flower as late as mid-August. During June and July most plants on the slopes mature, produce seed, and die while those in draws, where there is more moisture, often remain green and continue to grow for several more weeks.

Atriplex minuticarpa superficially resembles *A. powellii* Wats. and has been previously collected as such. However, *A. minuticarpa* differs from *A. powellii* in habit, leaves, flowers, and fruiting bracts. In contrast to *A. powellii, A. minuticarpa* has a shorter stature (10–20 cm vs. 20–100 cm); its branches are more widely divergent (50°–90° vs. 10°–30°); its leaves are smaller (5–10 mm long, 5–8 mm wide vs. 10–35 × 8–30 mm), usually single-veined instead of prominently 3-veined and they are mostly sessile and densely imbricate instead of petiolate; its fruiting bracts are much smaller (2 mm long × 1 mm wide vs. 3–4 mm long and wide), and are non-appendaged instead of prominently appendaged; and its flowering habit is monoecious, with male and female flowers borne together in axillary glomerules, instead of dioecious.

Plants of *A. minuticarpa* grown in a greenhouse and in a nursery at Brigham Young University, Provo, UT, maintained all of their distinctive characteristics.

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